topographic features of this remarkable country, and is probably the best small-scale map of Mexico in existence.

The main conclusion to be drawn from a critical inspection of these maps is that the publishers' staff is more highly trained in geographic compilation and engraving than in literary criticism. No very serious matter, perhaps, but still one worthy of consideration in the preparation of future editions.

In regard to possible improvements in compilation, the writer would suggest the revision of those parts of Sonora and Chihuahua shown on Sheet 89 of the Southwestern United States. Here, the boundary between these two important States is omitted, the drainage needs revision, and much detail might be added by referring to the best maps of Sonora—namely, that of Herbert, published in Nogales, and that of Max Bohmer, of Hermosillo, engraved by J. Köhler in Hamburg.

With all the painstaking effort in general compilation one notices a lack of quantitative expression in continental relief. For the United States the 40-mile contour map of the U. S. Geological Survey put in small scale by the experts of Justus Perthes' establishment would be a marvel of physiographic detail. In this respect the physical maps of the various continents published in Vivien de Saint Martin's General Atlas, now continued by Schrader and issued by Hachette in Paris, are worthy of attention for their exquisite detail and harmonious, distinctive, and expressive coloring.

A FIELD FOR STUDIES IN REGIONAL GEOGRAPHY.

BY

WALTER S. TOWER.

The Evolution of Geography.—Geography, in name at least, finds a place among the earliest sciences, but during its life the content of geography has undergone material changes. Until the nineteenth century geography was almost entirely descriptive, concerning itself with the study of the earth *and* its inhabitants. There was little place for explanation, and hence little correlation between the two elements. The first definite change was effected in the early part of the nineteenth century by the introduction of explanation along with description. Explanation brought out the relationships previously unemphasized, and geography came to be the study of the

earth *in relation to* its inhabitants. The idea of inhabitants was still almost synonymous with man. The element of human interests, therefore, was chiefly emphasized, while the side of plant and animal responses, in general, received little consideration.

The second change, by which geography was brought down to its present status, came about in the latter part of the last century as a result of the newly-propounded theory of evolution. The dawning idea that the earth had not been adapted to the convenience of its inhabitants, but that the inhabitants had gradually adapted themselves to their environment, made it necessary to regard geography no longer as the relation of the earth and man alone, but as the relation of the earth and life. The study of the fleshy leaves of desert plants was thereby made to belong to geography as much as do the fleetness of foot and the coloration of the animals, the long abstinence from drinking on the part of the camel, or the swarthy skins and nomadic habits of desert peoples. The turned-up leaves of a morning-glory on the sand dunes of Bermuda are items of geographic interest in the same way as are the white dress and the open huts of the Filipino native, or the snow houses and the bone implements of the Esquimaux.

Divisions of Geography.—The subject of geography, therefore, arranges itself naturally under two heads: the one dealing solely with the conditions of the physical environment, the other including all the responses that life has made to its environment. The former division has long been known as physiography, and has received much attention; the latter division has practically no generally-adopted name, and has, until recently, received but relatively little attention. For this division Professor Davis has suggested the term *ontography*—analogous in form and derivation to the associated term physiography—but it is rarely seen in print. In its place, rather, are found such compromises, or partially descriptive, terms, as "political," "commercial," "economic," "historical," anthropo-, zoo-, or phyto-, geography. Many of these terms are indefinite at the best, overlapping one another to such an extent that the province of each is but poorly defined even in the minds of those by whom they are commonly used. But the terms are still apparently destined to become firmly rooted in popular usage because of the degree of suggestion of the special field with which each is supposed to deal.

Present Tendencies in Geography.—The last decade has seen a great advance in the emphasis placed on the importance of geography as a study co-ordinate with others, and also as a funda-

mental influence in history, economics, and kindred subjects. Perhaps the best indication of this growing interest is shown in the many books for general reading and reference, and for use as texts, dealing with different phases of geography from a great variety of standpoints. Whole series of books of travel and exploration have been published, others are in the process of completion, under the name of geography, to catch the fancy of the many to whom geography is a new and, perhaps, passing interest. Many of these volumes contain much of value and interest to the trained geographer, and as a source of collateral reference they serve a useful purpose. But the general method of presentation is too often popular and at random, rather than that of intelligent, correlated interpretation. It is more of a reversion to simple description after the idea of a century ago than it is an advance according to the present understanding of the word "geography." The element of relationship between environment and life, instead of being vivified and dressed attractively, must too often be worked out by the reader or else lost entirely. These books, as a rule, deal with but a small chapter of geography, with a single country, as India, Arabia, or Japan; or with a single series of explorations, as along the Nile or the St. Lawrence valleys. In their generally readable form, however, they are valuable toward creating an ever greater interest in geographical knowledge; and in the character of the subject presented they may be regarded as forerunners of a general tendency in geographical studies.

The other great class of publications, the field of text and of special reference books, has been equally important, though perhaps less prolific. These books include texts of physiography; elementary and advanced geographies; texts of commercial and economic geography; and of historical geography, written according to all varieties of scope and methods of treatment. Among them also are found the exponents of the so-called "new" geography, who imply that the responses of life to its environment have recently undergone radical changes. So numerous are the different texts that in many ways there seems to be little need for additional attempts at mere re-statement. This is especially true with reference to physiography, while on the ontographic side it is, perhaps unfortunately, not so true. In the texts, aside from physiography pure and simple, the criticism can be applied almost without qualification, that they are throughout too historical, commercial, or economic, and not enough geographic. The commercial or historical aspects are set forth clearly enough, exact and in sufficient

detail, but the setting made by the physical environment is lacking: the element of relationship in the commercial or historical response to the environment is not always plainly or sufficiently brought out.

The realm of the fundamental principles in geography has been thoroughly covered in the many volumes which deal with different phases of the subject. Many of the elementary texts can necessarily deal only with the simplest and most important underlying facts, and therefore make man the most conspicuous consideration on the side of life. More complete texts include greater amounts of detail, but still are confined by space to matters of general, rather than of individual or of local importance. Before geography can be regarded as complete, however, these lesser details of local importance must be studied and grouped appropriately along with the large items.

Regional Geography—an Advance.—Herein, it seems, lies the direction for future advance in geography. The utilization of the general principles, applied to restricted areas rather than to world-wide forms and responses, will make possible greater attention to the local items, and will enable the working geographer to describe and explain every part of the area which he observes. Just as in the general studies only the more important land-forms can be described, usually by a type example, so only the larger responses, usually of man, can be explained. But when the area is limited, the number of forms is less and the smaller items with their responses find their appropriate places. Such studies in regional geography seem to offer the most profitable field at present for the active geographer.

The first step along the new way is apparently indicated by the great number of recent books, already referred to as semi-descriptive, semi-geographic in nature, dealing with different countries and regions of the world. Such books may well be regarded as forerunners of thorough, systematic regional studies, in much the same way that the descriptive attitude of a century ago was the forerunner of the present-day geography. In some of our own States there have already been thorough studies of the physical features; Maryland, New Jersey, and New York have furnished material for accurate studies in regional physiography. Only the relationship of life needs to be added to make complete correlated regional geographies.

Relation of Regional and Systematic Geography.—A regional geography, however, should be more than correlated, more than descriptive or complete in explanation. It must be systematic.

That general geography must be systematic is usually accepted by most teachers and students at the present time, though there is still an unfortunate diversity of opinion concerning the bases, and the order, of classification. Only by following some sort of system, however, can regional studies have any value with reference to the general study, or in comparisons with similar studies in other regions. If in every area each item is described as an unclassified special item, the most valuable part of the study, the element of relationship, the similarities and differences in a class of forms and responses, is lost. Therefore, to adopt some logical systematic scheme of classification which the regional study is to follow, becomes the duty of the geographer at the very outset. Such a classification is preferably drawn from general systematic geography, using every head and sub-head which has an example in the given region. This procedure not only simplifies the geographer's task, but also makes more apparent the actual contribution to the advancement of geographical knowledge.

A Logical Classification.—The most acceptable classification must be the one which is based on the simplest, yet most universal and fundamental characters: a classification at once broad enough to include every world-wide item which may be found, and yet capable of being applied to any region, however restricted in extent or variety of conditions. Systematic classifications are usually based solely on the characters of land-forms; while the responses of life, when classified at all, are grouped under the heads of the forms to which they are most closely related. As meeting the desired requirements, it has been suggested that:*

> Land forms are classed first as to kind, according to their rocky structure; thus one area may be of horizontal structure; a second may consist of broken and tilted blocks; a third may have a domed structure; a fourth may be folded; a fifth may be of volcanic origin, and so on.
>
> Each kind of land form is then to be classified according to its stage in the cycle of erosion, to which it is introduced by initial processes of deformation and (relative) upheaval, and through which it progresses by the action of weathering and washing, toward an ultimate goal of obliteration in a featureless plain close to sea-level, or in a smooth platform at an undetermined depth beneath sea-level. There is to-day abundant warrant for asserting that the sequence of developmental stages through this destructive cycle of erosion is remarkably systematic, and that very effective description of land forms may be given by characterizing them simply as young, mature or old.

Advantages of Classification.—Such a classification, framed for the whole realm of geography, so as to include the broadest conditions of world-wide importance, is no less readily adapted to smaller areas in regional studies. Two illustrations may be drawn from a study of Pennsylvania, where the same series of strata appear in the anthracite and in the bituminous coal fields. The first may be

* Davis, W. M.—"Systematic Geography." Proc. Amer. Phil. Soc. Vol. XLI. No. 170. 1902. p. 243.

classified under the fourth head suggested above, as closely-folded mountains; the second area may be classified under the first head, as a plateau of nearly horizontal strata; while to both may be added the description, on the basis of stage of erosion, "once base-levelled and again elevated and maturely dissected." This designation should immediately prepare the student for certain general conditions to be met—notably, accordance of upland levels, more or less rugged relief, habitations and lines of travel largely confined to the valleys, and so on. It therefore no longer becomes the geographer's task to recount the general features of all folded mountains or of all plateaux. He is free to devote every attention to the features peculiar to the individual region under discussion. By building from the general knowledge already possessed by the reader, the study can be carried to greater detail of description and more complete explanation of complexity, both in the environment and in the responses of life.

More Detailed Classification Necessary.—But in order that there shall be places in the scheme to receive those items necessarily excluded from the general treatise, there must be added elements brought forward to serve as bases of classification. There must be smaller sub-heads than can be made on the basis of rock structure and the amount of erosion on that structure. The effects of erosion on any given structure will be manifestly different when the strata are homogeneous, and when they are of varying texture. The texture of the rocks, therefore, becomes a natural and logical basis for further subdivision necessary for regional studies. If the folded mountain region of Pennsylvania is described as above as a folded mountain region, etc., certain general features are suggested; if described as a closely-folded mountain region, with alternating hard and soft strata, etc., the anticipated features at once become more specific. The alternation of even-crested ridges and narrow linear valleys is expected, as a result of differential rates of erosion, and many conditions of life may be predicted, as forested, untilled ridges, fertile populous valleys, and so on. Or, again, to say "a maturely-dissected plateau of nearly horizontal strata" means one thing, while to add "of varying texture" means much more of detail. In the general study there is not space for the details of lesser characters. The regional study, however, meets the need for their explanation; it is their proper place, and there they must be included.

Other factors besides rock texture must often be used as minor bases of classification. Humid and arid climates, and glaciation, for

example, all mean different physical forms produced and preserved, and hence different influences on life. A maturely-dissected plateau in the moist climate of Pennsylvania will not exhibit the same sort of sculpture by erosion and the same controls of life as will a maturely-dissected plateau in the arid West. An unglaciated portion of the plateau in Southern Pennsylvania does not present the same conditions as do the glaciated portions along the NewYork State line. A volcano in Ecuador may be identical in size and form with a volcano in Alaska, but the responses of life will be widely different in the two cases.

Terminology.—Physiography makes use of the terms young, mature, and old in describing well-known features characteristic of certain degrees or stages in the cycle of denudation, entirely apart from any idea of organic response. As pointed out in a recent article:*

> Confusion might easily arise if we try to classify a *region*, characterized by diverse features, as young, mature, or old.

But the difficulty is not with the terms or with the system in which they are employed. The difficulty is in applying them to a *region,* whereas they were intended as terms descriptive of *features* in a region. It is the province of general geography to describe and explain the conditions characteristic of land-forms, plains, plateaux, mountains, and rivers, in youth, maturity, and old age. Drawing illustrations is necessary, as in using western Pennsylvania and West Virginia as an example of a mature plateau, but not necessarily a region which is mature in every element of the topography. The student of a region must, therefore, constantly guard against the application of his special terms to the area as a whole. To give the appropriate conditions for every topographic feature, in whatever stage of development it may be, is one of the chief aims and purposes of the regional study, for only by that means can the complexity of conditions find an adequate explanation.

The Logical Successor of General Geography.—The nature of the regional study, therefore, makes it the logical successor of the general study. Without the preliminary training of the general systematic geography, the principles of which are to be applied to a given region, the study of the region can be of little more value in geography than would be regional studies in botany or zoology without a knowledge of the principles of plant or animal classification. Hence the regional study becomes valuable not only

* Johnson, D. W.—"Youth, Maturity, and Old Age in Physiographic Forms." Bull. Amer. Geog. Soc. Vol. XXXVII. No. 11. Nov. 1905. pp. 649-650.

to the young student in geography, as furnishing a source of detailed information, but it is valuable also to the advanced student and to the working geographer as offering a field in which he may build from the foundation already possessed, test the practical value of his scheme of classification, and in an intelligent interpretation of a region give an actual contribution to geographical knowledge.

Difficulty in a Broad Field.—A regional study—as of a State, for example—in order to be complete, must include a thorough description of all the physical features, properly classified and referred to their places with respect to the whole group of land-forms. Along with this description must be included the explanation of every condition of life in so far as it has been determined or modified by the physical environment. It must give the responses of man in his activities, social, political, historical, and economic; of plants and of animals, in their distribution, selection, and adaptation. Each must receive its proper weight and bear its relationship to the class in which it belongs.

It may be argued that, to be entirely logical in the systematic presentation, every influence on life should be grouped along with the appropriate land-form from which it is a response. But in any extensive study, as even of a single State like Pennsylvania, the diverse physical conditions entail many complex organic responses, and may make it advisable to divide the discussion sharply under two heads: under the one, physiography alone; under the other, all responses of life. Such a division not only favours clearness of presentation in a complex subject, but also gives more readily-contrasted conditions in the different areas, with a minimum degree of repetition.

Usefulness.—For a series of such regional studies as here outlined, there is an actual urgent need at the present time. Geography has an important place in the schools of all grades throughout the country. General text-books are available, with texts written according to schemes varied enough to meet the demands of every teacher and every class of pupils. The general importance of environment to human activities, in their broader aspects, is set forth in part in the texts of the commercial and the economic geography type. The increasing need now is for thorough studies of separate regions, by which the broader training may be supplemented. It is more often the local conditions which most closely affect the individual, and which make the subject most alive, especially to the student of one or two years' standing. And it is

the local conditions which hold the most important place in regional studies.

Excellent histories of many of the States in the Union have met the demand for regional studies in history. But almost nowhere has there been an attempt at similarly complete accounts either of the physical conditions which the pioneer met, or of the influences which these conditions have exerted over the subsequent development of the regions. To have such a series of regional geographies for each State or group of States in the country would mean a great stride toward a better and a more general understanding not only of the economic and the social development, but also of history and political conditions as well. Such studies should be of value, not alone to the student of geography, but also to the historian and the economist. They should be of value, not merely to the people of the State or region, but to every one who would gain an idea of the different elements on which the units of the nation have been built.

University of Pennsylvania.

AN AMERICAN PANAMA.

SOME PERSONAL NOTES ON TROPICAL COLONIZATION AS AFFECTED BY GEOGRAPHIC AND POLITICAL CONDITIONS.

BY

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Three points of view are at present important in the discussion of our new acquisition, Panama:

First, the engineering problem;

Secondly, the conditions of life as affected by climate or geographical conditions;

Thirdly, the colonial aspect, or the relations of the future colony to the government responsible for its development.

As to the engineering point of view, I can say nothing at first hand; but, in view of the political acrimony just now creating a cloud of doubt about this great enterprise, I venture to affirm that, at least in the opinion of several of the most eminent engineers of this country, if not of the world, the task of digging a canal from Colon